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IMAGES IN INTERVENTION

Hinge Motion and Excessive Negative Remodeling as a Cause of Early Saphenous Vein Graft Failure

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A 56-year-old male patient underwent a coronary artery bypass graft operation (CABG) using the left internal thoracic artery and saphenous vein graft (SVG) for severe coronary artery disease. Fourteen months later, he was admitted to our hospital because of recurrent angina. A coronary angiogram revealed that the mid-segment of the SVG was adhered to the sternum, and significant stenosis was observed at the distal end of the adhered segment (Fig. 1, left, Online Video 1), where hinge motion was apparent. Intravascular ultrasound (Atlantis SR Pro, 40-MHz, Boston

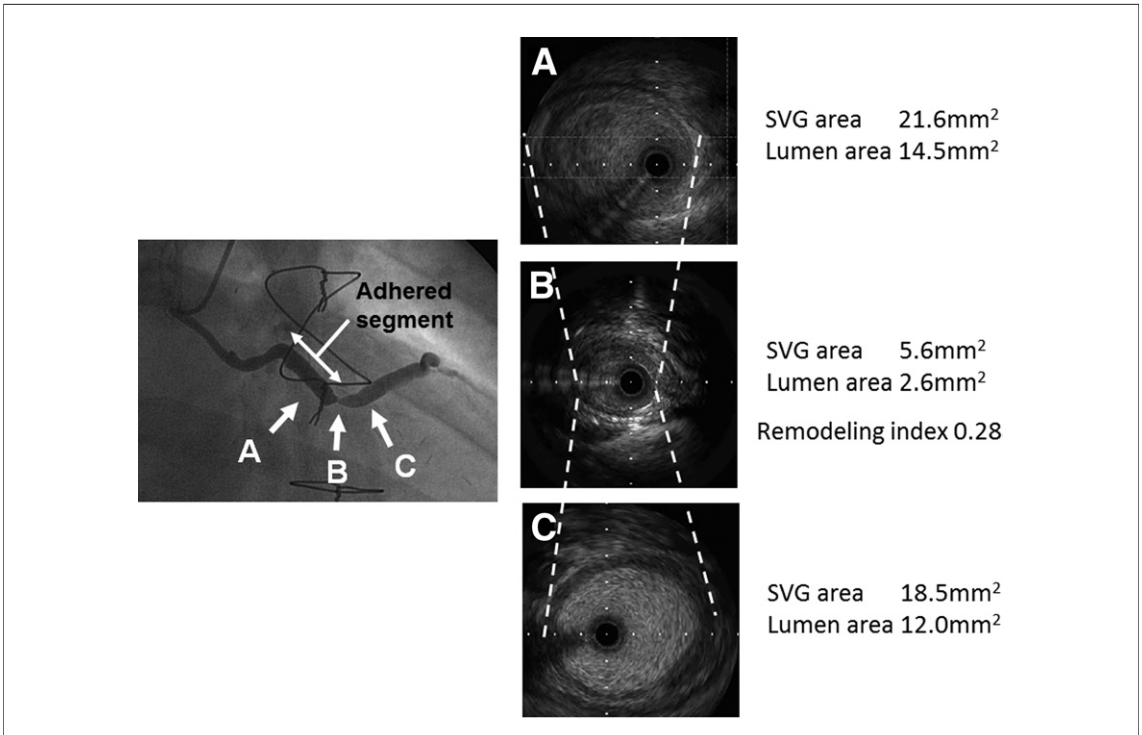

Figure 1. A Coronary Angiogram and Intravascular Ultrasound Images

A coronary angiogram **(left panel)** shows a focal stenosis at the hinge point **(B)** between adhered **(A)** and nonadhered **(C)** segments. Corresponding intravascular ultrasound images **(A to C, right panel)** demonstrate markedly decreased saphenous vein graph (SVG) area at the stenotic lesion **(B)**, with a remodeling index of 0.28. Remodeling index = lesion SVG area/proximal and distal reference SVG area (Online Videos 1 and 2).

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Scientific, Natick, Massachusetts) showed a minimal amount of plaque burden with excessive negative vessel remodeling at the stenotic lesion (Fig. 1A to 1C, right, Online Video 2). The lesion was successfully treated using a bare-metal stent under gradual (step-by-step) balloon inflation to avoid SVG perforation without the use of distal protection.

Luminal narrowing of the SVG is observed late after CABG because of plaque progression and decrease in SVG area (1). Our present case developed SVG stenosis at the hinge point between adhered and nonadhered segments of the SVG. Therefore, both adhesion and the hinge motion may have contributed to the development of excessive negative vessel remodeling leading to the early SVG failure without degenerated disease progression. Intravascular ultrasound was useful for deciding the interventional procedure in treating this unusual SVG stenosis.

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